CARBON POLLUTION REDUCTION SCHEME SUBMISSION

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1. The AusIMM

The AusIMM is the leading organization representing minerals sector professionals in the Australasian region. We represent more than 9,000 members, primarily in the disciplines of mining engineering, metallurgy, geoscience and management. Our members work for a range of organizations, including mining companies, minerals related consultancies, mining technology and service providers, and universities and research institutions.

Our role, which is to maximise opportunities for professionals in the minerals sector, encompasses the following activities:

- **Advocacy and Representation**
  We undertake advocacy on issues affecting the environmental, social and economic sustainability of the minerals sector in our region. Policy positions are developed through policy and discipline-specific committees, and through direct consultation with members via e-newsletter and online survey tools.

  All our members are bound by The AusIMM Code of Ethics to put the interests of the industry and community ahead of personal or private interests. The AusIMM represents a forum where technical experts can put forth their knowledge in the service of the broader community *as professionals*.

  We have been engaged in advocacy around greenhouse gas (GHG) emissions policy since the beginning of 2007, when we developed our policy paper '*Towards a Workable Global Emissions Scheme: Building on Our Relative Strengths*'[1] in consultation with members. In this paper we advocated in favour of a Federal policy that incorporated a long term emissions target, complemented by a significant increase in support for low and zero emissions technology development, as well as fiscal incentives/assistance for commercial uptake of new technologies.

  We have presented and published our policy at a number of forums and continually developed it in line with input from our members.

- **Technical Conferences and Publications**
  We provide a range of professional development services aimed at knowledge transfer, primarily delivered through our Conferences and Publications. Knowledge transfer between professionals in operational and research roles plays a critical role in facilitating the development and uptake of low emissions technologies in the minerals sector.

  Conferences such as *The AusIMM International Uranium Conference* and *Green Processing* have particular relevance to the technical and policy aspects of emissions reduction and were well attended by technical professionals, regulators and Government.

- **Professional Networking and Communication**
  We facilitate networking and communication that enables our members to build communities of interest. Networking forums include local branch events and technical meetings, online discussion forums, podcasts, e-newsletters and workshops. These activities underpin critical cross fertilization of ideas,

[1] To view '*Towards a Workable Global Emissions Scheme–Building on Our Relative Strengths*', go to: http://www.ausimm.com.au/content/docs/global_emissions.pdf

knowledge and services for the industry. For example our most recent issue of *The AusIMM Bulletin*, which is our flagship publication, includes a feature on Emissions Trading, which canvasses a number of strategies that can be adopted by minerals sector producers to reduce their emissions.

2. Background Issues – The AusIMM and the Science of Climate Change

The current imperative to reduce greenhouse gases in the atmosphere rests upon a number of scientific assumptions, all of which are subject to varying levels of contention in the scientific community:

- The first is whether anthropogenically induced greenhouse gas can be linked to an increase in average global surface temperature (causality)
- Presuming the previous statement is correct, the extent to which anthropogenically induced greenhouse gas emissions are influencing an increase in average surface temperature (extent of climate change)
- Presuming that the influence is significant, the risk that this poses to people and environment (extent of risk)
- Presuming that the risk is significant, the level of atmospheric concentration at which stabilisation of climate will occur (level of concentration)
- Presuming that the international community agrees on the level of atmospheric concentration of greenhouse gases, the policy settings that will ensue (policy measures)

The AusIMM does not accept each of these contentions uncritically. As a professional institute comprised of scientists and engineers, our members have a broad range of opinions on the science of climate change, and particularly causality. Geoscientists in particular are well placed to comment on what geological evidence can tell us about the climate patterns of the earth over the longer term.

Therefore, this submission should not be read as an uncritical acceptance of any one theory on the causes and consequences of climate change. We urge the Government to recognise that its policy is based on a series of assumptions that remain the subject of scientific debate.

The AusIMM has prepared this submission in the context of the Government's stated objective to reduce greenhouse gas emissions. As experts in minerals sector production, AusIMM members are uniquely placed to recommend technology-based measures to reduce greenhouse gas emissions that will not adversely affect the Australian minerals industry.

3. The Minerals Sector and Emissions Trading in a Global Context

The important thing is that any proposals that do not 'add up' to a defined global outcome be quickly rejected [2]

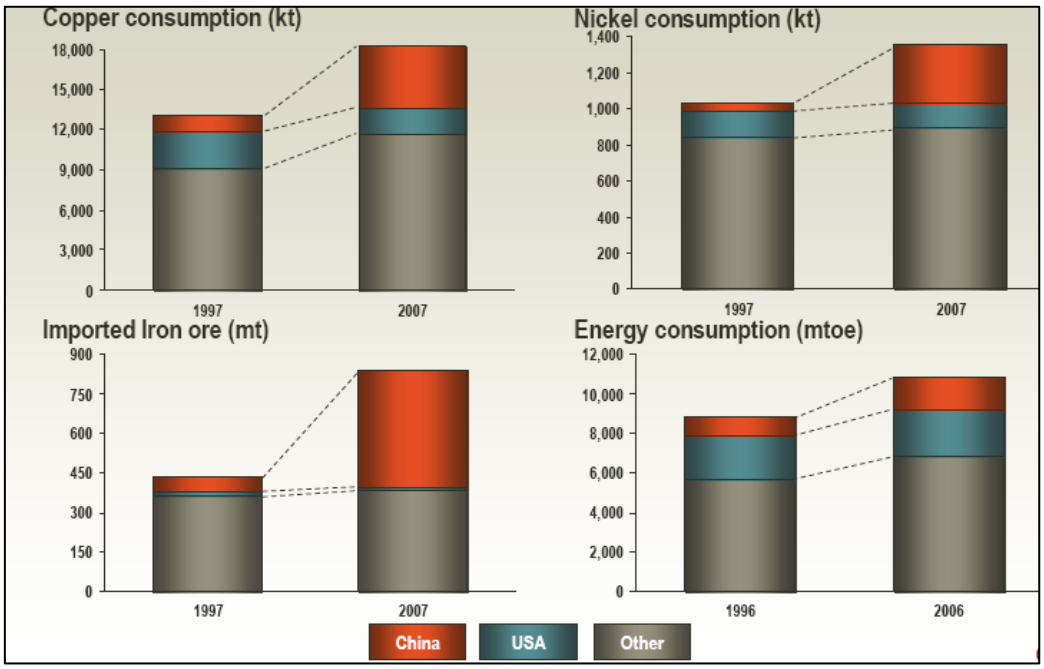
- Ross Garnaut

Since early 2007 The AusIMM has advocated a national strategy to reduce greenhouse gas emissions that incorporates the following elements: a carbon price, a long term emissions target and a comprehensive technology policy aimed at developing the technologies that can 'make the difference' to the global abatement task.

With global electricity production projected to treble by 2050, largely as a result of activities in emerging economies such as China and India,[3] it is clear that a raft of new technologies will be needed to bring down global greenhouse gas emissions in the coming decades. The key objective for Australian policy must not be merely to reduce our national emissions, which account for 1.6% of the world's total, but to assist our neighbours and resources customer countries with the technologies and processes that will enable them to bring down theirs.

The importance to the global abatement task of developing low emissions technologies for the production of key minerals, metals and energy resources currently consumed in developing countries is evident from the trends below. Figure 1 represents the increase in consumption in key commodities and energy in China over the last five years (all of which are major Australian export commodities). This level of consumption is projected to continue to increase over the coming decades.

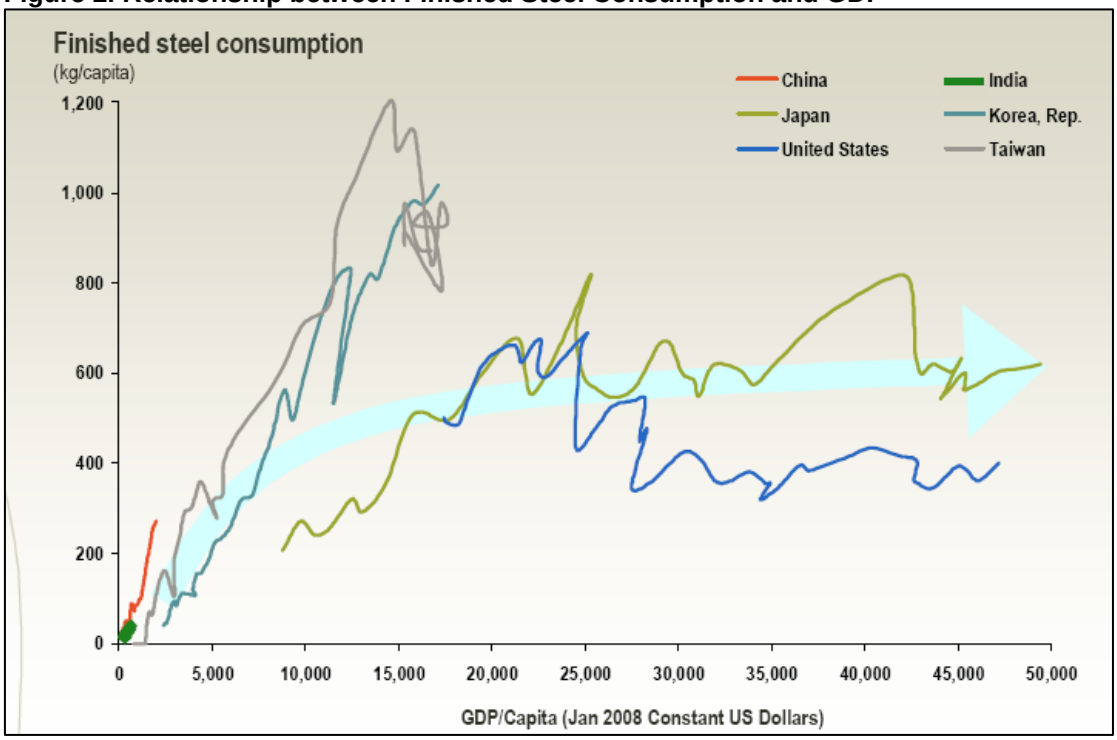
Figure 1. China's consumption of energy and mineral commodities other than steel[4]



[2] Garnaut, R. 'Targets and Trajectories' *Supplementary Draft Report* (September 2008), p 14
[3] International Energy Agency, 'Energy Technology Perspectives', OECD-IEA (2006)
[4] Kloppers, M. *BHP Billiton CEO Address to Melbourne Mining Club* (23 June 2008, Melbourne)
http://www.bhpbilliton.com/bbContentRepository/docs/melbourneMiningClubLondon.pdf

Figure 2 shows the link between finished steel consumption and GDP. Based on the trends in developed nations, China and India can be expected to significantly increase their level of steel consumption as standards of living increase.

Figure 2. Relationship between Finished Steel Consumption and GDP[5]



As a major producer of energy and energy intensive commodities, and with a highly developed research infrastructure, Australia can contribute to meaningful emissions reductions through technology development. These opportunities exist both in low carbon power generation, and in increasing energy efficiencies in mineral and metals production.

In the area of low carbon power, we have extensive expertise in clean coal research such as coal gasification and carbon capture technology (such as the Zerogen project) and also carbon storage options such as geosequestration. We are also significantly advanced in the development of renewable energy options such as geothermal electricity from hot rocks. As a major exporter of uranium and nuclear technologies, Australia has also played a major part in enhancing the safety in the nuclear supply chain by improving practices at home and abroad.

Australia is also at the forefront of energy efficiency improvements in the production of key commodities, from exploration, mining and mineral processing through to metal extraction and refining. The contribution that can be made through energy efficiency contributions should not be underestimated. Recent studies have suggested that energy efficiency improvements have the potential to make the greatest single contribution to abatement leading up to 2050.[6] These efficiencies will be generated both incrementally (through the application of energy efficiency practices such as heat recovery and new efficient comminution operations) and also

[5] Ibid.
[6] ABARE, 'Technological Development and Economic Growth,' Research Report 06.1, (Canberra,
January 2006), at
http://www.abareconomics.com/publications/2006/RR06_1_ClimateAsiaPacific.pdf p 60.

through a transformation in the industry that should occur as new processes such as dry granulation emerge into practice.

The development and deployment of relevant technologies will not take place in a vacuum. As we have previously indicated to Government, a tightly focused, nationally coordinated strategy is needed. In this document, The AusIMM has made recommendations relating to the proposed Carbon Pollution Reduction Scheme, encompassing both additional policies and scheme design, to ensure that the Australian minerals sector realises its full potential to contribute to the global abatement task.

Additional Policies

- A comprehensive technology policy
- An energy policy with clearly articulated long term goals
- A way forward with developing countries

Scheme Design – EITE measures

- Establishing a workable baseline for credit allocation
- Enabling the level of allocations over time to be dynamic
- Stakeholder collaboration in the development of and statement of goals

4. ADDITIONAL POLICIES

4.1 A comprehensive technology policy

The AusIMM has previously advocated for a GHG emissions policy with three key components:

- A carbon price imposed through an emissions trading scheme
- Long term targets that are transparent and predictable
- A comprehensive technology policy, encompassing support for low emissions technology R&D, and fiscal incentives/assistance for commercialisation and deployment of low emissions technologies

The AusIMM acknowledges that there are programs and grants aimed at fostering low and zero emissions technology research. These include research taking place through universities, CRCs, the CSIRO, and ARC, as well as the $500 million Low Emission Technology Development Fund, the $500 million National Clean Coal Fund and the $500 million Green Car Innovation Fund.

Whilst these initiatives are worthwhile, they are largely focused at the back end of the technology development process, namely, research and development (R&D). But that is not the whole of the story. The journey from concept to commercialisation includes each of the following steps: research, development, demonstration, and commercialisation prior to widespread deployment. It is the latter parts of the process that are often the most costly and involve the greatest risk to industry.

Meanwhile, the funds that are available for the front end of the technology development processes tend to be technology specific. The lack of support available for the latter stages of technology development was identified as an issue in the Garnaut Draft Report, in which it was stated that *"..many of the industry support programs have the effect of providing incentives for early movers, but there is a conspicuous absence of a targeted technology-neutral program for dealing with [commercialisation] spillovers*."[7]

The need to focus greater resources on the front end of technology development was also highlighted in the *Stern Report on The Economics of Climate Change*. The Stern Report suggested that support for commercialization of low and zero emissions technologies tended to be under-resourced globally, and should increase two to five times from current levels of around $34 billion in order to meet the global abatement task.[8] The Stern Report also indicated that the level of public support for commercialization should be higher than that for R&D, as the latter stage of the process was more costly.

The advice in these reports accords with experience in the minerals sector, where demonstration and commercialization are the most costly areas of the technology development process. The risk and expense of bringing a step change technology from concept to commercialization for industries with large plant is significant, because of the scale of the project and time frames involved and the potential for sterilizing areas from productive operation for a period of time.

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[7] Garnaut, R., *Draft Report*, (4 July 2008) Chapter 16, p 417.

[8] Stern, N., 'Stern Review Report on the Economics of Climate Change,' *Paper prepared for HM Treasury* (October 30, 2006) at http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/stern_review_report.cfm, p 347.

These risks are evident in the number of projects abandoned before commercial operation. Recent examples include the A$2 billion, hot briquetted iron project in the Pilbara, Western Australia and the Australian Magnesium Corporation smelter in Gladstone, Queensland, both of which were unsuccessful.[9]

One of the few recent success stories is Rio Tinto's HIsmelt plant in Kwinana. This example is illustrative both of the cost of bringing a concept through to commercialisation, and the impact that step change technology can make in emissions reduction. The HIsmelt process is one of the few disruptive technologies that have arisen in iron and steel making over the last 150 years. Total costs for developing this process ran into about half a billion dollars with a gestation period of about two decades.[10] Rio Tinto has indicated that had there not been 150 per cent tax concession on R&D at the time that it built its trial plant at Kwinana, the project may not have proceeded to commercialisation.[11] The potential impact of this development on global emissions during a time of increasing demand for steel is significant, as HIsmelt uses roughly 25% less electricity than conventional processes.

The justification for Government support for commercialisation is described in the Draft Garnaut Report as 'commercialisation spillover'. This term describes a market failure whereby an early developer of new technology cannot fully recover on their investment in demonstration and commercialisation due to the following:[12]

- **Knowledge externality spillovers** – the firm developing the technology will not be able to patent all aspects of the technology
- **Skills spillovers** – the firm developing the technology will incur the costs of developing a specialised human capital base that it cannot retain for itself
- **Regulatory and legal spillovers** – the firm developing the technology will 'pave the way' in terms of Governmental approvals for the technology, a benefit that other firms can then capitalise on
- **Support sector externalities** – the firm developing the technology will have developed relevant product standards and specifications in supporting sectors, that may be sold on to other firms

The AusIMM submits that additional support is required to overcome systemic barriers to commercialization (in the form of spillovers) of step change technologies in our most energy intensive sectors.[13] Some possible policy instruments through which support could be delivered include:

- Tax concessions for investment in low emissions technology demonstration and commercialization;
- Accelerated depreciation of assets for low emissions technology demonstration and commercialisation; or

[9] Upstill, G., and Hall., P, 'Innovation in the minerals industry: Australia in a global context' *Resources Policy*, Volume 3, Issue 3 (September 2006) pp 137-145 .
[10] Farr, I., 'Fundamental Technology Change in the Iron and Steel Industry,' in The AusIMM New Leaders Conference Proceedings 2006: Riding the Boom, (April 2006) p 39.
[11] Rio Tinto, 'Submission to a Background Paper for Stakeholder Consultation on a s National Trading Scheme', (14 November 2005), at http://www.cabinet.nsw.gov.au/emissions/RT.pdf , p 8.
[12] Garnaut, *Draft Report* , (4 July 2008), Chapter 6, p 408
[13] Stern, above n 8, p 347.

- An Australian system of matching grants where private investors demonstrate externalities (ie spillovers) in low emissions technology demonstrations and commercialisation projects

The pros and cons of each of these measures need to be investigated more closely. Meanwhile the level and scope of public support for the back end of technology development needs to be reviewed in order to ensure that it is adequate.

Finally, it is of concern that the Federal Innovation Review is conducted independently of the Green Paper. It is hoped that an integrated approach will be taken between our national innovation policy and Carbon Pollution Reduction Scheme.

Recommendations

1. Address the market failure that exists for demonstration and commercialisation of low emissions technologies through an appropriate policy instrument

2. Review the level and scope of public support for research and development to ensure that it is appropriate

3. Low emissions technology development goals to be considered as an integrated part of national innovation policy

4.2 A National Energy Policy with clearly articulated long term goals

With the advent of a carbon constraint, Government indication on the likelihood of access to low carbon, low cost energy in the coming decades is a critical issue for businesses and individuals. Without such an indication, they are unable to determine sensible forward investment strategies to transition to a carbon constrained economy. Consequently it is of deep concern that plans for an emissions trading scheme are going ahead prior to the release of a National Energy Policy.

The smelting industry constitutes one example where information regarding future electricity sources is critical to decisions regarding investment in new technologies. Without access to low carbon electricity, the emissions for any given metal are similar, regardless of processes, therefore there is no need for businesses to consider a shift in processes for new plant. However if low carbon electricity sources are available, a shift in smelting technologies from carbothermic reduction processes to electrothermic processes can in most cases reduce carbon emissions to minor levels. This shift would effectively move carbon emission control from the smelting operations to power generation, where it could be most efficiently handled.

Table 1 indicates the range of processes by which various commodities can be produced. Should a low carbon, low cost form of base load power come online, these industries could significantly reduce their emissions by only investing in the development of new plant that utilises the process with lowest direct carbon use.

Table 1. Estimates of Energy and Carbon Use for Smelting Processes[14] (Process details in Table 2)

Metal	Process	Total direct energy MJ/t	Direct carbon use –fuels and fluxes kg/t	Indirect carbon use – for power generation kg/t	Total carbon use
Zinc	Electrolytic	14,900	20	1,030	1,050
Zinc	Imperial Smelting Furnace	39,400	1,130	250	1,380
Lead	Sinter/ Blast Furnace	13,200	380	120	500
Lead	Kivcet	14,600	260	230	490
Lead	Direct leach/ electrowin	3,800	20	230	250
Secondary lead	Rotary furnace	4,900	90	70	160
Secondary lead	Electrolytic	2,750	20	130	150
Copper	Flash smelting/ Electr. Refining	12,000	240	215	455
Copper	Leach/ SX/ electrowin	10,500	5	750	755
Nickel (Sulfides)	Matte smelting/ Electr. Refining	94,650	1,530	1,630	3,160
Nickel (Laterites)	Pressure leach/ electrowin	95,600	2170	2,040	4,210
Aluminium	Alumina/ Electrowin	97,000	1,170	4,240	5,410
Steel	Blast furnace/ BOF	20,100	460	380	840
Steel	DRI/ EAF	24,400	260	600	860

Given the long life of most smelting operations, firms contemplating plans for new plants or upgrades need to be given an indication as to the future availability of low energy baseload power as soon as possible. This information is critical so that they can consider implementing appropriate changes to smelting technologies.

This is particularly important for investment in technology development, as electrothermic processes are currently not commercial for all commodities. That is, for zinc and aluminium, suitable electrochemical technologies are well established, but for copper the application of full hydrometallurgical processing to sulphide concentrates is quite limited (however it has been demonstrated on a commercial scale and could be more widely applied with the necessary economic incentives). For lead, primary electrowinning processes have been developed, but also have not yet been applied on a large commercial scale to enable implementation without some commercial risk. In the case of nickel, no fully hydrometallurgical extraction routes involving leaching and electrowinning are in commercial operation.[15]

[14] Sinclair, R., 'Some thoughts on smelting technologies with future restrictions on carbon emissions', *The AusIMM Bulletin* (Sept/Oct 2008) p 67.
[15] Ibid.

Thus, in order to create an environment conducive to the necessary technological developments, the Government must lay out a clear way forward on energy policy that will guarantee low cost, low carbon base load power for the future. This policy is critical not only for business investment in new plant, but also for a range of business decisions in the minerals sector, eg whether the operator of a mine should invest in a new fleet of hybrid excavators or continue to rely on its existing fleet. That is, investment in hybrid mining vehicles will have little impact on emissions profile if no low carbon electricity sources are available.

The issue is of energy policy is not just relevant to industry but across all of Australian society. For example, Australian families want to know whether their investment is truly 'green' over the long term, or is merely transposing emissions from the tailpipe to the smoke stack.

The AusIMM does not advocate any one form of energy; we are of the view that a matrix of all electricity sources, including coal with geosequestration, gas, renewable, geothermal and nuclear will be required globally, and that each must be considered on their merits for application in Australia. A key consideration must be the ability of any given electricity source to deliver low cost, base load electricity for Australian people and industry in a timely and predictable manner.

A fully informed and evidence based debate on the potential of nuclear power in Australia is needed. The AusIMM does not advocate nuclear power. However we believe that it would be politically irresponsible to dismiss nuclear power as an electricity source based on historical antipathy. This is especially important given the current context, whereby an increasing number of Kyoto signatories, such as the UK and Germany, have recently indicated that it is an indispensable means of meeting their targets for the longer term without compromising standards of living.

Recommendations

1. Develop, as a priority, a National Energy Policy that outlines a matrix of electricity sources to be available over the next two decades (to mirror scheme trajectories and 'gateways')

2. Ensure that a fully informed debate occurs on the relative merits of nuclear power in the context of a carbon constrained Australia

4.3 A way forward for developing countries

Developing countries are expected to account for more than 80% of growth in emissions over the next two decades. Unless they accept binding obligations, any measures taken in developed countries to reduce emissions will have negligible impact on the overarching goal – the stabilisation of global greenhouse emissions.

In the past, developing countries have not accepted binding targets on the philosophical basis that as the current developed countries were able to grow their economies without emission limits, developing countries should be excluded from any obligation to curb emissions for some time.

This argument is too simple and calls for greater scrutiny. What developing countries are really interested in is *not* the right to emit per se, but the ability to develop their economies with equivalent access to low cost, base load energy and low cost

industrial processes, that was available to developed countries when they were growing their economies.

The challenge for developing economies, as for the rest of the world, is to unbundle base load power and industrial processes from emissions. The only way to do so is to commit to a comprehensive program of international technology development and transfer.

The AusIMM supports the proposal put forward in the Draft Garnaut Report that the international community encourage developing countries to adopt obligation in stages. To begin with, targets could be one-sided for developing countries, providing the option to sell permits internationally but no obligation to buy for compliance. Least developed countries would not be expected to take on targets immediately, but would be expected to implement agreed policies in trade-exposed, emissions-intensive industries.

In return, high-income countries would commit to funding research, development and commercialisation of low-emissions technology in developing countries. The AusIMM supports the creation of the International Low Emissions Technology Commitment as outlined in Chapter 13 of the Draft Garnaut Report for this purpose.

The flagged 'package deal' approach described above would combine technology assistance with the obligation for developing countries to create a level playing field for all trade-exposed energy intensive industries. This is particularly important for minerals and energy producers.

The AusIMM also submits that an international scheme for technology cooperation to replace the Clean Development Mechanism (CDM) is urgently needed. Australia should show leadership on this issue in Copenhagen. Currently, the CDM is the only policy measure that facilitates technology assistance in developing countries, however it is a grossly inadequate instrument for enabling the scale of cooperation needed. The short time frames in which projects are required to deliver emissions reductions in order to be eligible (three years) under the CDM means that only small scale projects qualify. This excludes all significant minerals and energy projects from eligibility under the scheme.

An additional problem with the CDM is the criterion of 'financial additionality', ie that the investment would not have otherwise occurred by virtue of being profitable. This requirement sets up an artificial dichotomy between profit and technology-based emissions reduction. The implicit assumption that emissions reduction technology development will never be profitable is of deep concern, and is telling of the extent to which the scheme's initial designers underestimated the role that technology development could play in a low emissions future.

The proposal for an International Low Emissions Technology Commitment as flagged in the Garnaut Draft Report would be a suitable policy measure to replace the CDM.

Recommendations

1. Australia to take a leadership role in negotiating staged inclusion of developing countries into the Kyoto Protocol, with one-sided obligations for developing countries, and requirements to implement agreed policies in trade-exposed, emissions-intensive industries for least developed countries

2. Australia to take a leadership role in negotiating an alternative policy instrument to the Clean Development Mechanism, in particular in relation to short time frames and the requirement of 'financial additionality'

3. Australia to take a leadership role in the creation of an International Low Emissions Technology Commitment Fund, to replace the CDM

5. SCHEME DESIGN

5.1 A workable baseline for credit allocation

The AusIMM supports the measures proposed in the Green Paper that aim to ensure that energy intensive, trade exposed industries (EITEs) are put on an equal footing with producers in countries that do not face a carbon constraint. This must be the aim of allocations, rather than to compensate EITEs for the operation of the scheme.

The AusIMM also supports the proposal that eligibility for assistance as an EITE should be determined based on a *threshold level of emissions per unit of revenue*. This will allow Government to accurately identify those producers for whom an emissions price will constitute a significant cost to production.

The AusIMM strongly disagrees with the proposal that eligibility for assistance for a particular firm be determined with reference to the average emissions for that industry. Rather, eligibility should be determined with reference to the average emissions *for the industrial process*. This is due to the fact that, in the minerals and energy sector, the carbon-intensity will depend on the mining method and processing technologies used. For example, because of the different processing methods, nickel-laterite operations are three to five times more carbon-intensive per unit of metal than nickel-sulphide mines. Similarly, SXEW copper is more carbon-intensive than copper produced via a normal concentrator-smelter-refinery route. Thus referring to an "average" figure as the baseline will fail to meet the objectives of the allocation. Rather than a transitioning mechanism, it will result in windfall gains for some and overnight bankruptcy for others.

The AusIMM submits that the emissions intensity baseline should be determined at the level of *industrial process*. To do otherwise would be to defeat the objective of the allocations, which is to avoid carbon leakage.

Recommendation

1. Emissions intensity baseline should be determined with reference to emissions average for the industrial process used, rather than the emissions average for the industry

5.2 Enabling the level of allocations over time to be dynamic

The AusIMM strongly disagrees with the Government's preferred position that assistance rate to EITEs be reduced over time. We recognise the underlying arguments behind this position – namely that as new EITE plant and industries come online, the number of permit allocations will increase, which will reduce the number of credits in other sectors. Therefore a steady reduction is proposed. However the position does not take into account economic, scientific and environmental realities in the minerals sector.

The current economic drivers for our booming minerals sector are the rapidly emerging economies in the Asia-Pacific. As stated in the Green Paper:[16]

[16]Department of Climate Change. 'Carbon Pollution Reduction Scheme *Green Paper*', (2008), p 7.

"*Australia's economic growth has benefited from the rapidly expanding developing economies, particularly in the Asia–Pacific region, driving international demand for our abundant mineral resources, including coal, iron ore, bauxite, alumina, and uranium. Australia is a net energy exporter, with the sector growing by an average 5 per cent a year in real terms over the past two decades, to $38 billion in 2006–07 representing 3.8 per cent of GDP. In 2005–06, coal accounted for 62 per cent of total energy export value, with liquefied natural gas contributing 11 per cent and uranium one per cent*."

Most recently, ABARE has reported a record $70.5 billion investment in advanced minerals and energy projects.[17]

Accelerating world resources demand has brought significant benefits for a minerals endowed nation such as Australia. However this appetite is not without its challenges. A recent report by Dr Gavin Mudd, entitled '*The Sustainability of Mining in Australia - Key Production Trends and Their Environmental Implications for the Future*'[18] outlined a number of trends that have emerged in the mining sector. These trends are:

- Production: gradually or exponentially increasing, which is likely to continue for some time;
- Ore Grades: gradually declining, unlikely to ever increase in the future with some metals likely to decrease by about half in the near future (eg. gold);
- Open Cut Mining: now widespread, likely to be sustained in the future though the long-term is hard to predict as new mineral deposits are likely to be deeper;
- Waste Rock / Overburden: increasing rapidly, likely to be sustained in the future and closely linked to open cut mining (especially for coal and base metals);
- Economic Resources: commonly increasing but some remain stable or gradually declining, future linked closely to exploration, technology and economics.

Minerals producers in Australia are keenly aware of the challenge of increasing demands on production and declining ore grades outlined in Dr Mudd's paper. A number of research projects are underway to reverse the trends described above. These include investigations into more effective bulk methods for underground mining, to reduce the amount of rock moved per unit of material mined. Meanwhile the development of more energy efficient processes for minerals processing, extracting and refining is a key goal of a number of projects being carried out through public research organisations such as CSIRO Minerals Down Under Flagship and the Centre for Sustainable Research Processing.

The mineral industry in Australia has a highly developed research infrastructure. As a major minerals innovator and minerals service and technology exporter, we have the potential to make a major contribution to developing the technologies that will reverse the current trend of an ever expanding social and environmental footprint in mining.

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[17] ABARE, '*Minerals and energy: major development projects – April 2008 listing'* (May 2008) at http://www.abareconomics.com/publications_html/energy/energy_08/ME08_April.pdf

[18] Mudd, G., 'Sustainability of Mining in Australia'. Research Report 5, (October 2007) at http://civil.eng.monash.edu.au/about/staff/muddpersonal/SustMining-Aust-aReport-Master.pdf

Notwithstanding these developments, given the current level and projected levels of demand for minerals commodities, it is likely that the net emissions from EITEs will increase over time, even as the emissions intensity of the material being mined comes down. Consequently it would not be advisable to reduce the assistance rate for EITEs over time, as new producers come online. This could result in insufficient allowance for EITEs leading to loss of competitiveness and eventually 'carbon leakage' as exploration and mining investment shifts to other countries which are not similarly carbon constrained. This would prove harmful not only to our economy, but to the global abatement effort, as the countries attracting investment would likely not have comparable research infrastructure to Australia. Our ability to identify options for reducing the minerals industry's energy consumption and emissions and develop sustainable solutions/technologies would be lost.

As previously stated, the rationale for reducing the allocation rate to EITEs is to keep the net allocations constant to reduce the burden on other sectors of Australian society. However this needs to be weighed against the hardship that would be faced by Australian business and society in transitioning to a low carbon economy without the buffer of a booming mineral export industry.

In 2006-07 alone, mineral resources exports increased by 16 per cent to $90.8 billion, accounting for more than half of Australia's commodity earnings. During this time the industry contributed $7.1 billion in State and Federal taxes. The benefits of mining innovation go far beyond the immediate economic rewards. The recent surge in mining activity in Australia has underpinned major expansions in supporting services, and spurred growth in the high value-add mining technology services sector, which is worth more than $4 billion in export earnings in its own right.[19]

Thus, The AusIMM submits that a holistic approach to assessing the economic impact of reducing assistance rates to EITEs during a time of increased mineral demand and simultaneously declining ore grades is needed. The increased carbon reduction burden on other sectors needs to be weighed against a sharply declining GDP should we undercut our key export sector.

Recommendation

1. Allocation of credits to EITEs to remain constant based on a threshold of emissions per unit of revenue, until such time as developing countries accept obligations, or sector specific agreements are concluded

5.3 Stakeholder collaboration focus in development of and statement of goals

The challenge to reduce emissions includes all stakeholders, including individuals, households and businesses. The all encompassing nature of the challenge was captured in a statement from the Business Council of Australia as part of their *Strategic Framework for Climate Change*:[20]

[19] Invest Australian and Austrade, 'Innovation Australia: Backing Australia's Ability', Palamedia (2007) at http://www.innovationaustralia.net/article/article.php?article=10,174 .
[20] Business Council of Australia, Strategic Framework for Emissions Reduction (3 April 2007) at http://www.bca.com.au/Content/101042.aspx

"*An effective, sustainable response to climate change is ultimately about moving from the current high-emission global economy, to a low-emission economy. Given the current reliance on high-emission products and services permeating through all levels of the economy, we should be under no illusion about the scale, economic cost and complexity of this transition, one which is arguably the most far-reaching since the industrial revolution*."

The Green Paper, in contrast, tends to focus less on the collaborative way forward, and more on identifying past wrong-doers. For example the summary document reads: "...*climate change is a by-product of industrialization. Environmental damage is caused by greenhouse gas emissions which are predominantly carbon-based. The emissions constitute carbon pollution yet those who generate the pollution are not held accountable for the costs they impose on us all*."[21]

Such statements are unhelpful. They inappropriately externalize the problem as a fault of industrial producers, when the problem of reliance on low cost carbon based energy and emissions intensive processes is embedded in the way that our society functions.

Given the scale of collaboration and change that will be required from all social and economic stakeholders as the scheme is implemented, it is recommended that this kind of dichotomy is avoided. That is, the scheme, and the language used to communicate its goals, should focus on forward opportunities for industry and society, not on identifying past 'villains'. It is clear that Australian society has benefited significantly from our vast reserves of coal which have provided cheap base load power and allowed for the emergence of energy intensive industries. The challenge now is not to constrain 'industrial opportunists', but to find ways to harness our significant technical and policy ingenuity to enable both our local industries and the world to transition to low carbon means of production.

Australia already has a leading role internationally in the development and implementation of processes for dialogue around the topic of climate change and greenhouse gas emissions.[22] This social infrastructure can be adapted and developed to provide a collaborative approach to the development of an emissions trading scheme.

Recommendation

1. Goals of the scheme to focus on forward opportunities for business and broader society – particularly on our ability to harness our significant technical and policy ingenuity to enable both our local industries and the world to transition to low carbon processes and technologies

[21] Department of Climate Change. 'Carbon Pollution Reduction Scheme *Green Paper*', (2008), p 2.
[22] The Heat is On: A report on the future of energy in Australia; CSIRO, 2005; Green Cross Australia, National Peoples' Assembly.